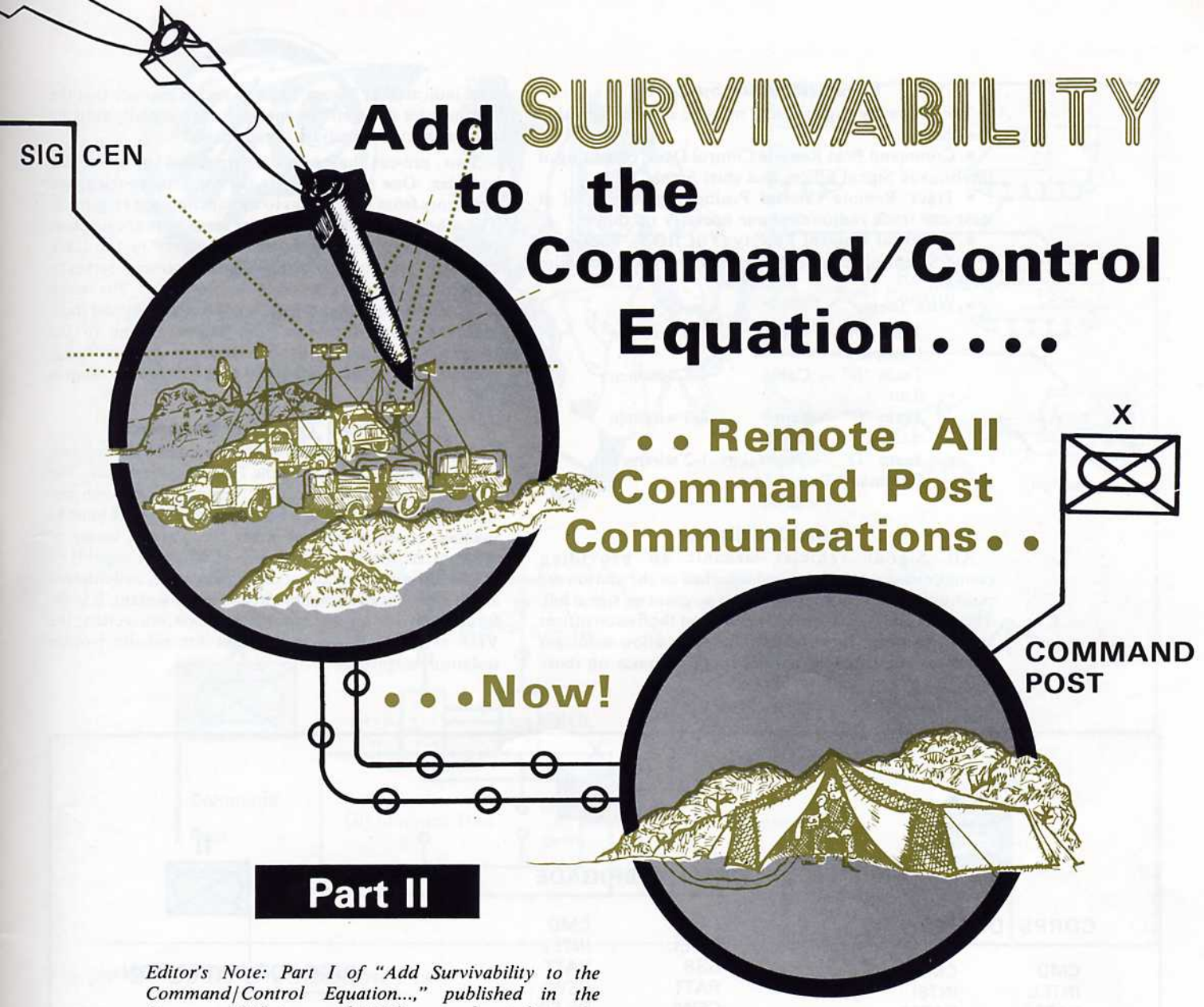
Add SURVIVABILITY to the Command/Control Equation....



Part II

Editor's Note: Part I of "Add Survivability to the Command/Control Equation...," published in the Summer 1979 issue of TAC, was directed to the commander. This second portion details the concept of remoting command post communications from the tactical CP as it applies to the Signal officer.

by MAJ Nelson B. Collard, Jr.

With command support of the remoted concept, implementation can proceed with considerably less resistance. The techniques outlined in this section certainly are not the only methods by which the concept may be implemented; however, it is strongly recommended that they be followed for at least the first trial before changes are begun.

General

The basic concept of the system is the rapid remote installation of systems from signal hill to the command post area using 26-pair cable. Systems are streamlined, taking advantage of "normal-through" test point cabling and subordinating the admin/support system to the command post system.

Detailed wire and cablehead procedures which establish engineering circuits all through the installation and operations phases are implemented. Maximum use is made of pre-cut field wire harnesses for complexes, and specific team assignments are made in the wire/cable section; maximum effort is directed toward cross-training of the four teams.

A full-time remote control desk is established in the command post where the Signal officer or chief Signal NCO controls all communications systems for the commander and staff. A full-time remote control operator is positioned in the track complex on signal hill where a hot line is terminated to control critical radio nets. A full-time technical control (TECHON) facility is established on signal hill which is collocated with the cablehead for isolation and/or correction of on-site trouble and to attend to the liaison vehicle radios. Supervision of all signal hill track drivers for radio operations, and for refueling and manning purposes, is transferred to the Signal platoon leader/ sergeant. Signal hill evacuation, wheeled vehicle refueling and driver availability on signal hill become the responsibility of the platoon leader or sergeant.

Organization for Support

The following organization must be structured within the unit:

- Command Post Remote Control Desk, consisting of the brigade Signal officer and chief Signal NCO.
- Track Remote Control Position, consisting of at least one track radio-telephone operator on duty.
- Technical Control Facility (TECHON), consisting of the Signal platoon leader, platoon sergeant and wire sergeant.
- Wire Teams

Team "A" — Track Complex	2-3 wiremen
Team "B" — Cable Run	4-6 wiremen
Team "C" — Command Post	2-3 wiremen
Team "D" — Tactical Command Post	1-2 wiremen

Initial Installation

All Signal vehicles organic to providing communications support and attached to the section are positioned by the platoon leader or sergeant on signal hill. The track complex with extensions and the liaison officer vehicle complex must be established to allow sufficient room for the erection of directional antennas on those nets indicated in Figure 1 and in such a manner that the commander and staff can operate from it initially until the general purpose medium is established.

Two pre-cut harnesses are required in the track complex. One is installed by the track radio-telephone operators from their tracks to the junction box (Figure 3). The other is installed by the wire team from the junction box to initial and contingency positions in the track complex. This "telephone and parallel harness" serves to remote circuitry back into the complex. The track complex remote control position is manned by the track radio-telephone operators and has a hotline to the command post remote control desk and an engineering hotline to both the TECHON and CP remote control desk.

Cablehead TECHON Operations

A general purpose small medium is established around the cablehead and serves as the TECHON operation. The cablehead itself is a pair of J1077 junction boxes with pre-wired pigtails secured to a board. The TECHON must be manned continuously by either the platoon leader or sergeant or the wire chief, any of whom is capable of troubleshooting/rerouting radio, telephone, switchboard and communication center circuits in the system. It is the focal point for on-site trouble isolation/correction; the VHF terminal is the focal point for off-site trouble isolation/correction

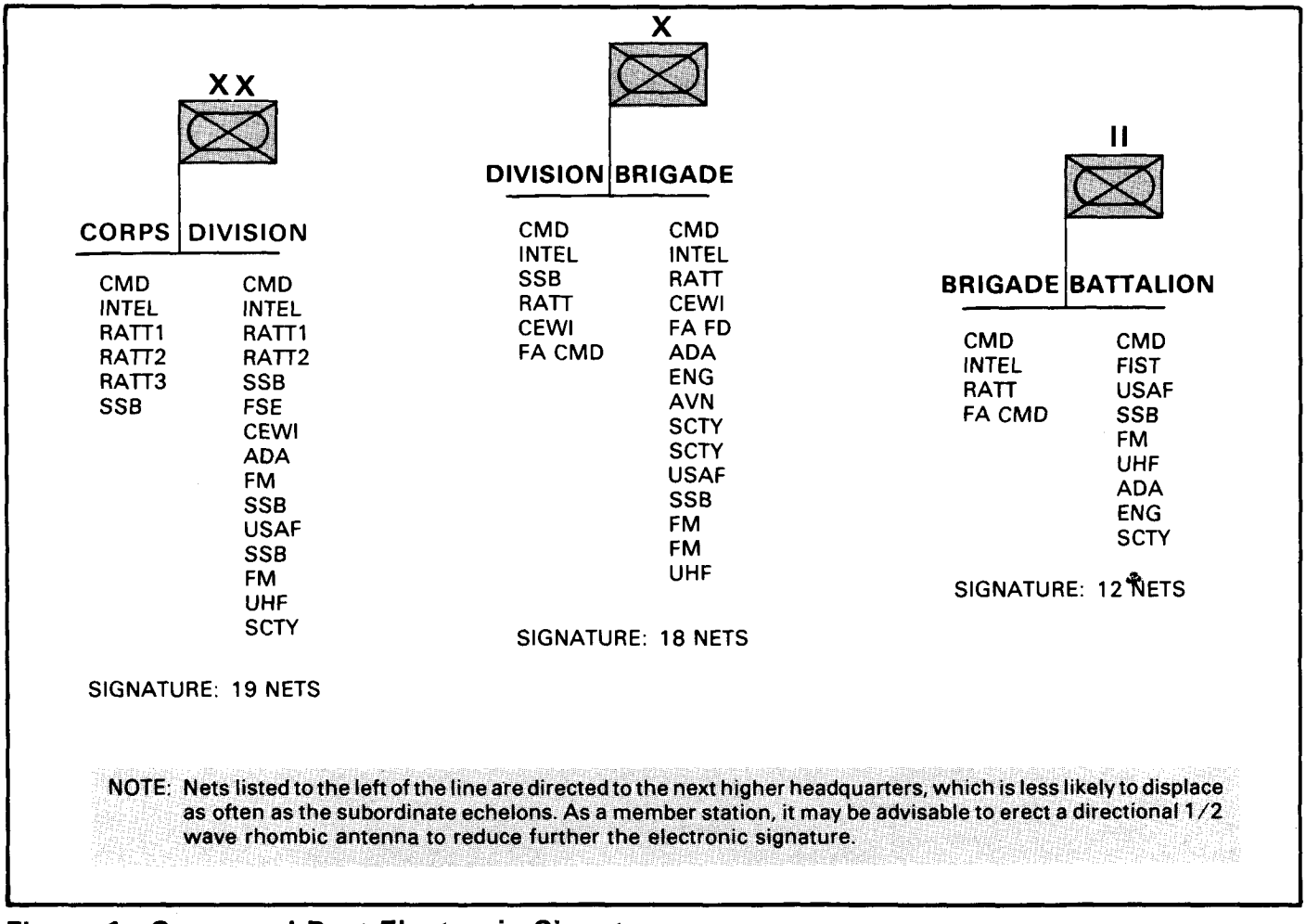


Figure 1. Command Post Electronic Signatures

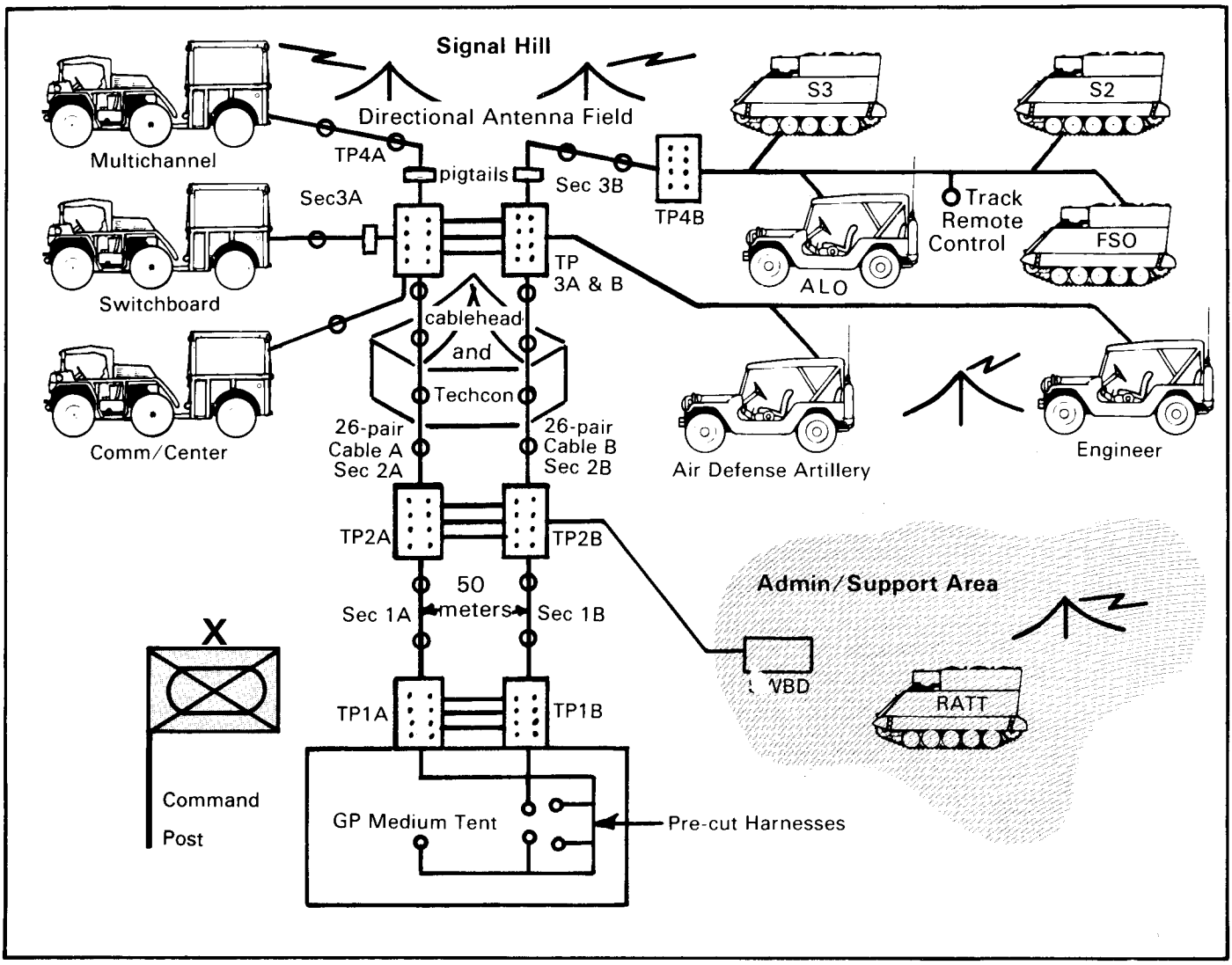


Figure 2. Cable Distribution Plan

Dual Cable Operations

A dual cable system is established as indicated by Figures 2 and 4. The dual cable system accommodates the 40 circuits which appeared on most of the US Army, Europe exercises in which the writer participated. Close inspection of the dual cable cut sheet indicates that the engineer, VHF and remote control circuits are "hot-looped" or strapped over. This permits re-engineering with all critical parties in the event of a single cable failure.

Circuits are coordinated, "prioritized," and complementary. For example, the remote circuit for the division command net on pair 04 of Cable A is lost; a simple hock-over at any of the three test points (Figure 2) will restore proximity communications to the staff. While initially, the brigade S-3 will find himself on the division G-3 intelligence net, he will at least have proximity communications with the division G-3 at the division command post. Telling the staff what is about to happen and implementing a frequency change can be accomplished from the remote control desk to maintain critical command/control. In a similar manner, all hot lines, secure switchboard lines and type radio nets are coordinated and complementary.

Pigtails are used at test points (TP3A&TP3B) (Figure 2) for flexibility in channelization of cables. Experience in running the number of cable sections described in this article has resulted in two or three unusable pairs throughout the length of the systems. Pigtails at the cablehead permit the most flexibility in pair transfers.

Switchboard/Communications Combat Operations

The switchboard ties into the test point as indicated in Figure 2, using 26-pair cable and a pigtail. The decision to place the switchboard in the command system is based on operations with two different divisions in Europe. It has been found that the majority of off-site common-user traffic originated in the command post and not in the admin/support area. A second switchboard is installed in the admin/support area and tied into the system, also indicated in Figure 2.

The communication center ties into the test point (Figure 2) using field wire. The decision to place it on signal hill again is driven by the fact that most traffic originates at the command post and by the interest generated for a "quiet command post" with no generators in the vicinity. The trade-off of immediately available hard copy message support versus noise and infrared signature is one of which the commander must be informed and for which adjustments must be made.

Note: Two harnesses are required in the track complexes. The remote harness is pre-cut, coiled with slack and run immediately after position occupation by the track RTOs to TP 4B. The staff/RTOs then operate from their tracks while the wire teams are establishing parallel communications. The telephone and parallel harness is pre-cut, coiled with slack and run back into the track complex from TP 4B to provide simultaneous communications both in the track complex during preparation of the GP medium tent and in the event of contingency operations. This method has proved more efficient than permitting RTOs to lay their own remote lines into the test point and operating station simultaneously.

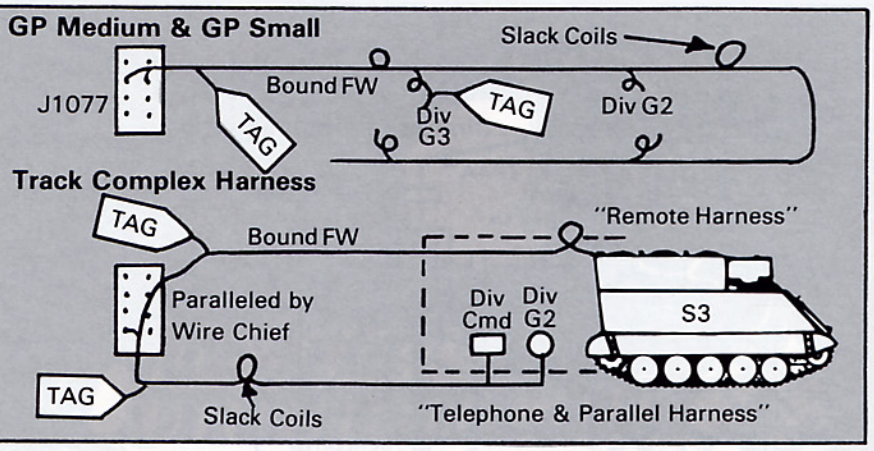


Figure 3. Remote Harnesses.

CABLE "A" SECTIONS 1A, 2A

CABLE PAIR	INST ORDER	FROM	TO	SYS CHAN	STRAP
01	1	TP1A	TP3A		Yes
02	2	VHF	CP Remote Cont		Yes
03	3	Track Remote Cont	CP Remote Cont		
04	4	Div Cmd Remote	CP S3		
05	6	Bde Cmd Remote	CP S3		
06	8	FA CF Remote	CP FSCC		
07	10	ALO FM Remote	CP ALO		
08	12	LNO FM Remote	CP LNO		
09	14	LNO FM Remote	CP LNO		
10	16	Div SSB Remote	CP S3		
11	18	66 Secure	CP S3	66/3	
12	20	Div FSE	CP FSCC	66/2	
13	22	56 Secure	CP S3	14/9	
14	24	66 Nonsec	24 Nonsec	66/1	
15	26	56 Nonsec	24Nonsec	14/2	
16	28	66 C/C	24 C/C	66/7	
17	30	14 Nonsec	24 Nonsec	14/1	
18	32	24 Nonsec	Spt Swbd		
19	34	VHF	24 Nonsec		
20	36	Div TAC	CP S3	14/6	
21					
22					
23					
24					
25					
26					

NOTE: Site Designation Numbers:
66 Div Main
56 Div Alt
24 Bde CP
14 Bde Trains

CABLE "B" SECTIONS 1B, 2B

CABLE PAIR	INST ORDER	FROM	TO	SYS CHAN
01	1	TP1B	TP3B	
02	2	VHF	CP Remote Cont	
03	3	Track Remote Cont	CP Remote Cont	
04	5	Div Intel Remote	CP S2	
05	7	Bde Intel Remote	CP S2	
06	9	Fac Cmd Remote	CP FSCC	
07	11	ADA FM Remote	CP ADA	
08	13	ENG FM Remote	CP ENG	
09	15	CMO FM Remote	CP CMO(S5)	
10	17	ALO SSB Remote	CP ALO	
11	19	66 Secure	CP S2	66/4
12	21	Arty S3	CP FSCC	66/5
13	23			
14	25	66 Nonsec	24 Nonsec	66/10
15	27	24 Nonsec	CP CU #1	
16	29	14 C/C	24 C/C	
17	31	14 Nonsec	24 Nonsec	14/3
18	33	24 Nonsec	Spt Swbd	
19	35	Tracks	24 Nonsec	
20	37	ADCEO	CP Remote	
21				
22				
23				
24				
25				
26				

Figure 4. Cable Pair Assignments—Dual Cable Operations

Command Post Remote Control Desk

The focal point for both on- and off-site trouble isolation/correction is the command post remote control desk. It is here that the concept will succeed or fail. The brigade Signal officer or chief Signal NCO must man this position and service the staff with communications support. Hotlines to the VHF terminal, cablehead/TECHON, and to track complex remote control positions, permit the remote controller to determine *in seconds* where the fault lies in a nonoperational circuit/system. A call to the VHF terminal for a "ringback," coupled with a call to the cablehead, can isolate telephone troubles. A call to the track complex remote control position for a ringback, again coupled with a call to the cablehead, can isolate remote radio circuit troubles in a similarly rapid manner. Prepositioned cutsheets and Tal/sound-powered telephones at test points have proved invaluable in trouble isolation/correction.

The hotline between the two remote controls has also been found to be more effective than remote set wire communications because of ringer break-down/shut off. The remote control desk in the command post also serves as a focal point for apprising the staff continuously of available alternate means in the event of temporary failures. In the event of a total single cable failure, the remote control desk can accomplish a hock-over in position.

VHF Team - Establishes system; lays section 3A to cablehead; terminates VHF circuit.
Wire Team "A" - Lays section 3B, establishes TP4B; lays telephone and parallel harness; connects remote harness from track RTOs; terminates telephones.
Track RTOs - Lays remote harness to TP4B; connects remote sets to telephone and parallel harness.
LNO Vehicle RTOs - Lays field wire to TP3B; connects remote sets in track complex to telephone and parallel harness.
SWBD Team - Establishes switchboard, lays 26-pair with pigtail to cablehead.
COMMCEN Team - Establishes COMMCEN; lays field wire to cablehead; positions runner at track complex.
Wire Team "B" - Lays sections 2A and 2B (minimum separation 50 meters); establishes TP2A and TP2B; terminates/mans engineering circuit at TP2A; reports to cablehead; lays sections 1A and 1B.
Chief Signal NCO - Establishes TP1A and TP1B; establishes CP remote control desk; terminates/mans eng; VHF and remote control circuits and div sig bn syscon circuit at TP1A; reports to cablehead; verifies circuits.
Wire Team "C" - Lays CP harness (Figure 3); connects to telephones to div CP in control (if no duplicate phones available).
Chief Signal NCO - Informs S-3 that they are prepared to start phased transfer of command/control to GP medium.

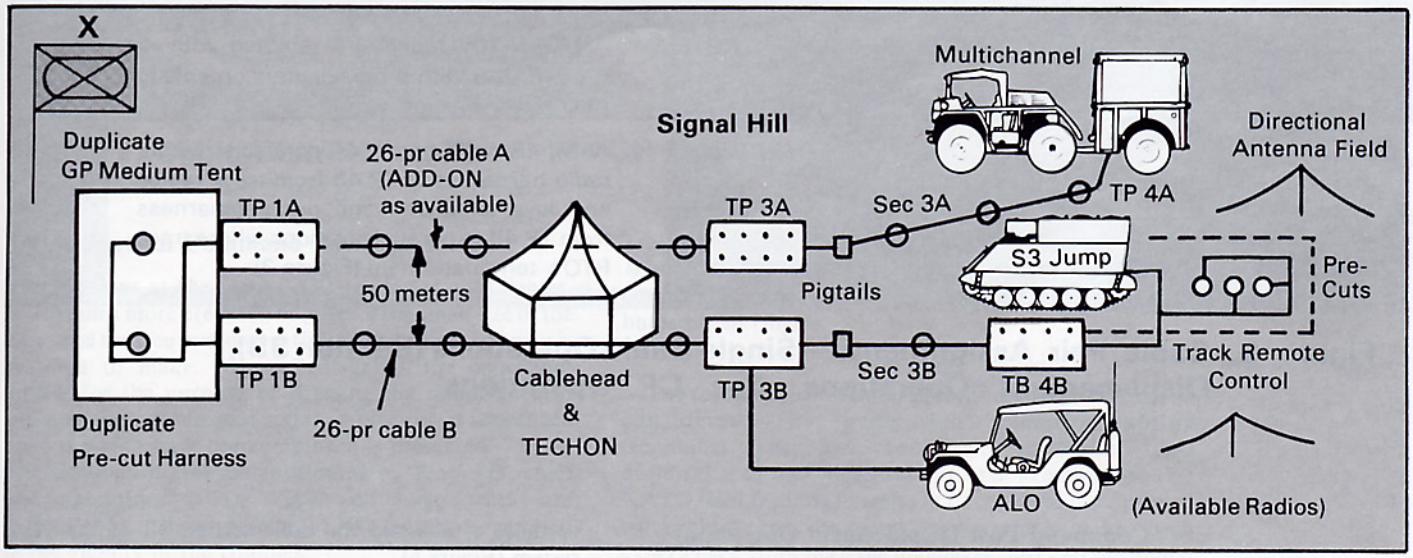


Figure 5. Cable Distribution Plan — Displacement Operations

Installation Sequence/Action

The following installation sequence/action listing is presented in detail to indicate the degree of training and coordination that is required. Portions of it apply not only to the initial installation of the dual cable system but to subsequent installations at jump and/or tactical command posts as well.

Site occupation/vehicle positioning by platoon leader/sergeant.
Wire Chief - Establishes cablehead (TP3A, TP3B), channelizes sections 3A, 3B; terminates/mans engineering, VHF and remote control circuits at TP3A; receives reports of system installation progress/verification at cablehead, tracks situation status for SIGO.
Staff - Mans radios inside track vehicles.
Wire Team "A" - Directed by platoon leader/sergeant, disconnects remotes in track complex and releases to Team "B."
Wire Team "B" - Transports to GP medium and releases to Team "C."
Wire Team "C" - Connects remotes to harness.
Chief Signal NCO - Verifies remote communication status and informs S3.
Staff - Displaces to remoted command post GP medium.
Wire Team "A" - Disconnects remaining phones in track complex; transports to GP medium, releases to Team "C."
Wire Team "C" - Connects phones to harness, installs neon bulbs on all ringers.
Chief Signal NCO - Verifies status.

CABLE PAIR	INST ORDER	FROM	TO	PARALLEL TO TRACK COMPLEX
01	1	TP 1A	TA 3A	TP 4B (Signal Officer)
02	2	VHF	CP Remote Control	Signal Officer
03	3	Div Cmd Remote	CP S3	S3
04	4	Div Int Remote	CP 32	S2
05	5	Bde Cmd Remote	CP S3	S3
06	6	Bde Int Remote	CP S2	S2
07	7	FA CF Remote	CP FSCC	FSCC
08	8	FA Cmd Remote	CP FSCC	FSCC
09	9	ALO FM Remote	CP ALO	ALO
10	10	ADA FM Remote	CP ADA	ADA
11	11	ENG FM Remote	CP ENG	ENG
12	12	LNO FM Remote	CP LNO	LNO
13	13	Div SSB Remote	CP S3	S3
14	14	ALO SSB Remote	CP ALO	ALO
15	15	Div G3	CP S3	S3
16	16	Div G2	CP S2	S2
17	17	Div FSE	CP FSCC	FSCC
18	18	DivArty S3	CP FSCC	FSCC
19	19	Div TAC G3	CP S3	S3
20	20	SWBD	Track Complex	
21-26		Open		

NOTES: 1. AN/GRC-106 radios are remoted with AN/GRA-39 with 5-pin adapters organic to ALO radio vehicles.

2. At TP 4B, wire team "A" connects remote radio harnesses to TP 48 from track radios and lays telephone and parallel harness from TP 4B to parallel positions where track RTOs terminate them (Figure 3).

Figure 6. Cable Pair Assignments—Single Cable Operations (Section 3B), Displacement Operations, Tac CP Operations

Command Post Displacement Operations

Operations during command post displacement are basically the same as during initial set-up, with the added complication that less equipment is available. If the brigade has employed a tactical command post, the preferred method is a temporary transfer of control to the tactical command post accompanied by both rapid close-out of the old command post and initial set-up at the new location. Operations described in this article do not address, for security/survivability reasons, the closure of the main command post on the tactical command post.

If the brigade has no tactical CP, assets normally used in support of that echelon of command and control are available. In this situation, displacement systems may be established as indicated by Figure 5. Due to limited assets, a single cable system is established in a manner which supports an add-on of the complete dual cable system as the main body closes. Cable assignments would be similar to those established for cable section 3B of the base system (Figure 6).

If the brigade tactical command post is employed, but a transfer of control is not desirable because of the tactical situation, a new command post position may still be prepared for occupation. This is accomplished by forming a composite displacement team from Wire Teams "A," "B" and "C." Cable A and associated distribution boxes may be removed from the dual cable system in their entirety after the wire chief and chief Signal NCO have cut over circuits from cable to cable in the priority established in Figure 4. Depending on the degree of command/control the commander desires the tactical CP to exercise, operations may at this time be split between the existing command post and the tactical command post, thereby freeing some radio vehicle assets to accompany the composite jump team and advance party to the new location. In both displacement scenarios, a duplicate set of CP harnesses must be constructed (Figure 3).

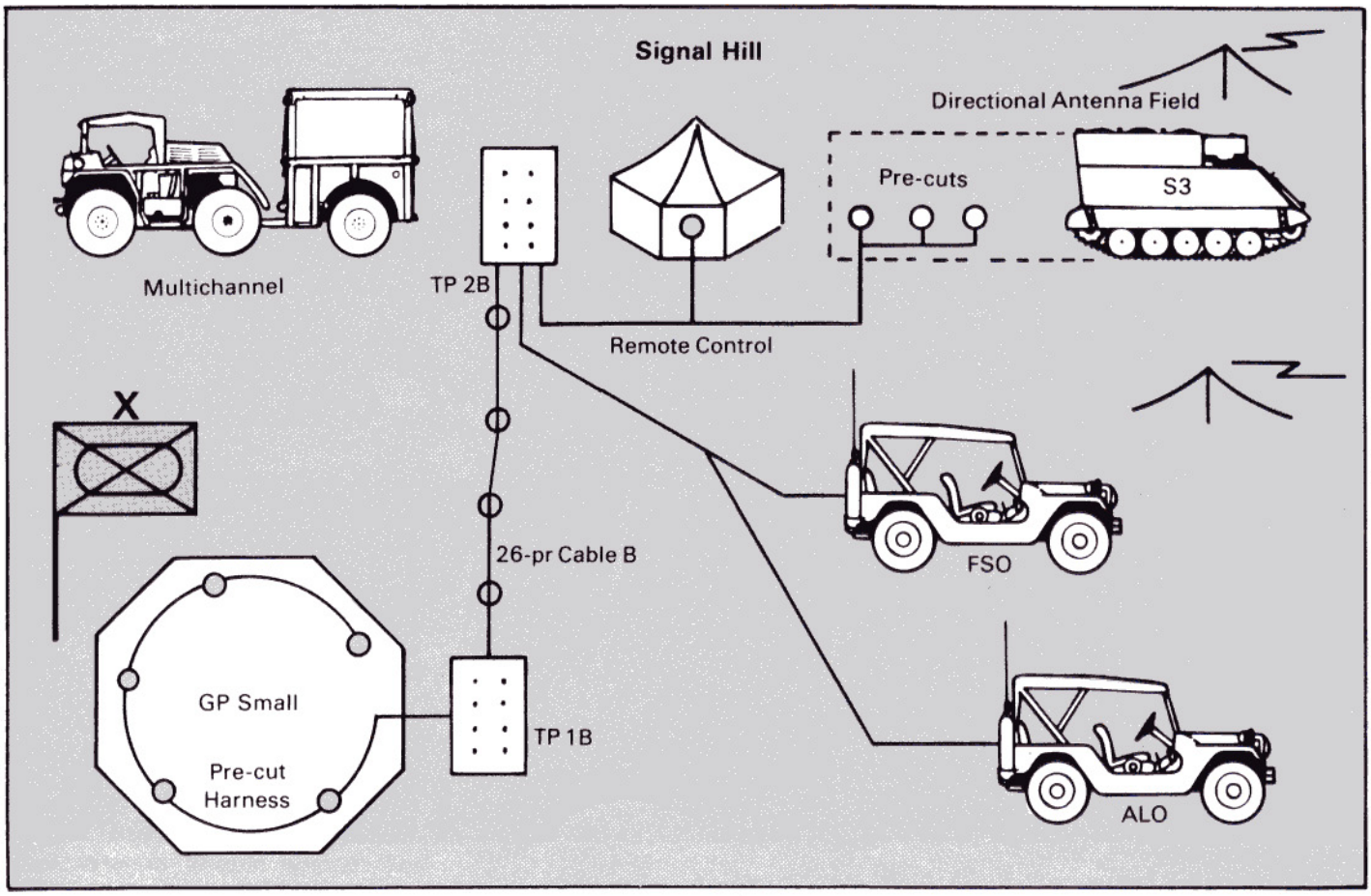


Figure 7. Cable Distribution Plan—Tac CP Operations

Tactical Command Post Operations

Operations at the tactical CP are faster, and lighter, and require more precision because of the small size of the team and the frequent moves the tactical command post is required to make. Figure 7 diagrams the operation. Again, for the purpose of stressing the importance of training and coordinated action, a type list of sequenced actions which have been employed is presented.

Site Occupation/vehicle positioning by Team "D" chief and operations NCO, VHF and jump track are collocated; extension is set up; LNO vehicles positioned in the vicinity of the complex.

Wire Team "D" Chief - Establishes cablehead (TP2B); channelizes cable 2B per Figure 6 (example); connects remote harness from track; connects telephone and parallel harness; terminates/mans eng; VHF and remote control circuits; verifies circuits.

Track RTOs - Erects track extension, directional antennas (1/2 wave wdl/tt rhombics); lays remote harness to TP2B and terminates telephone and parallel harness with remote sets.

LNO RTOs - Lays field wire to TP2B; terminates remotes in track extension on telephone and parallel harness.

Wire Team "D" - Lays telephone and parallel harness; teminates telephones; lays section B; establishes TP1B; lays CP harness; verifies circuits; and informs operations NCO.

Staff - Moves inside tracks.

Wire Team "D" - Disconnects remotes in track extension; transports to GP small and installs remotes.

Staff - Displaces to GP small.

Wire Team "D" -Disconnects remaining phones in track complex; transports to GP small; and connects neon light bulbs on all ringers.

Comment

The technical installation procedures described can be considered "first generation" remoting/cabling techniques. They have been tested on several local dispersal area and local training area exercises, on one NATO field training exercise in Europe and have proved workable to the command. Some resistance has been experienced from both the maneuver staff and the Signal platoons accustomed to other doctrinal methods. The concept will work and will support command post survivability through proper training if "spearheaded" by the Signal officer. The writer is prepared to offer further details or assistance in the interest of implementing and improving upon the concept within a given command.

MAJ Nelson B. Collard, Jr., currently an assistant professor of military science at Wofford College in Spartanburg, SC, enlisted in the Signal Corps in 1963 and was commissioned through ROTC at the University of Washington. Holding a bachelor's degree in communications, he has attended the Field Artillery Officers Advanced Course, the Command and General Staff College and the Electronic Warfare Course at Fort Leavenworth, KS. He has commanded a Signal company and a Field Artillery battery and has served as a brigade and battalion Signal officer in CONUS, East Asia and Europe.